

(19)



Europäisches Patentamt

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(11)

EP 0 865 800 A3

(12)

## EUROPEAN PATENT APPLICATION

(88) Date of publication A3:  
08.12.1999 Bulletin 1999/49

(51) Int Cl.<sup>6</sup>: A61N 1/05

(43) Date of publication A2:  
23.09.1998 Bulletin 1998/39

(21) Application number: 98301945.6

(22) Date of filing: 16.03.1998

(84) Designated Contracting States:  
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE  
Designated Extension States:  
AL LT LV MK RO SI

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(30) Priority: 17.03.1997 US 820473

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## (54) Medical electrical lead

(57) A medical electrical lead for establishing an electrical connection with a tissue of the body, the lead having a lead body 6 and a semi-cylindrical cuff 15. In the preferred embodiment the semi-cylindrical cuff features one or more electrodes 10, 11, 12. The semi-cylindrical cuff having a long flap 16 which wraps about the cuff and a short flap 17 which wraps about the long flap. The semi-cylindrical cuff is relatively stiff as compared to the short flap. The short flap, in turn, is relatively the same stiffness as the long flap. The stiffness of each flap may be varied, however, so that one is more or less than the other, and in turn, than the cuff. Through such a multi-flap construction the electrodes may be positioned proximal to a nerve in such a manner that the mechanically induced damage may be minimized or even entirely eliminated. Finally, a method of implanting such an electrode is also disclosed.

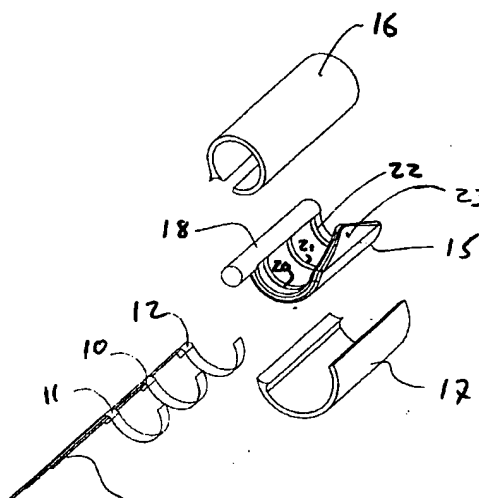


Fig 4A

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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 1945

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 487 756 A (KALLESOE KLAUS ET AL) 30 January 1996 (1996-01-30) * column 4, line 38 - column 9, line 4; figures *	1-9,14	A61N1/05
A	US 5 344 438 A (TESTERMAN ROY L ET AL) 6 September 1994 (1994-09-06) * column 3, line 4 - column 4, line 45; figures *	1,2,4,7, 14	
A	US 4 602 624 A (NAPLES GREGORY G ET AL) 29 July 1986 (1986-07-29) * column 2, line 41 - column 5, line 45; figures *	1-5,7,8	
A	US 4 590 946 A (LOEB GERALD E) 27 May 1986 (1986-05-27) * column 3, line 9 - column 4, line 68; figures *	1,2,14, 16	
A	EP 0 723 788 A (MEDTRONIC INC) 31 July 1996 (1996-07-31) * page 3, column 3, line 16 - page 4, column 5, line 29; figures *	1-4,6,7, 13	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A61N
A	US 5 400 784 A (DURAND DOMINIQUE M ET AL) 28 March 1995 (1995-03-28) * column 2, line 53 - column 4, line 18; figures *	1-3,7,8	
A	US 5 273 053 A (POHNDORF PETER J) 28 December 1993 (1993-12-28) * figures *	1,2,14	
A	US 3 654 933 A (HAGFORS NORMAN R) 11 April 1972 (1972-04-11) * column 2, line 16 - column 4, line 35; figures *	1,2,14	
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>18 October 1999</b>	Examiner <b>Rakotondrajaona, C</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/92 (Pct/Co1)

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ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 1945

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The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-10-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5487756 A	30-01-1996	NONE	
US 5344438 A	06-09-1994	DE 4413065 A	27-10-1994
US 4602624 A	29-07-1986	NONE	
US 4590946 A	27-05-1986	NONE	
EP 0723788 A	31-07-1996	US 5741319 A	21-04-1998
		AU 694822 B	30-07-1998
		AU 4093296 A	08-08-1996
		CA 2168188 A	28-07-1996
		JP 8229139 A	10-09-1996
US 5400784 A	28-03-1995	AU 7978994 A	04-05-1995
		WO 9510227 A	20-04-1995
		US 5634462 A	03-06-1997
US 5273053 A	28-12-1993	AU 655373 B	15-12-1994
		AU 4873293 A	12-05-1994
		CA 2106332 A,C	03-05-1994
		DE 69324102 D	29-04-1999
		EP 0597213 A	18-05-1994
		JP 2523445 B	07-08-1996
		JP 6218066 A	09-08-1994
US 3654933 A	11-04-1972	DE 1955517 A	30-07-1970
		DK 131973 B	06-10-1975
		DK 132105 B	27-10-1975
		FR 2023549 A	21-08-1970
		FR 2023550 A	21-08-1970
		GB 1296550 A	15-11-1972
		GB 1298473 A	06-12-1972
		GB 1298474 A	06-12-1972
		JP 48036280 B	02-11-1973
		NL 6917338 A,B	20-05-1970
		SE 375909 B	05-05-1975
		SE 364872 B	11-03-1974

EPO FORM P4459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82